What is claimed:

1. A power saving automatic zoned dryer assembly adapted for use in a printing press having printed substrate passing along a substrate travel path, comprising:

printed substrate moving along a longitudinally extending substrate travel path;

a dryer mounted facing the substrate travel path, the dryer having a plurality of heating elements defining a plurality of longitudinally extending side by side heating zones facing the substrate;

a plurality of longitudinally extending heated areas on the substrate, each heated area corresponding to the area heated by exposure to one of the heating zones;

a heat sensor for each of the plurality of heated areas on the substrate, the heat sensors generating a signal indicative of the substrate temperature of the heated area;

a control unit capable of regulating the output of each of the plurality of heating zones in response to the signals generated by the heat sensor for the heated area corresponding to one of said plurality of heating zones; and

whereby the temperature of the heated areas on the substrate can be controlled to approximate a desired set point temperature.

2. The assembly of claim 1 wherein said plurality of heating zones comprise at least two heating zones, each having an output which is separately adjustable.

3. The assembly of claim 1 wherein the heating zones are associated with a housing having a plenum chamber and a source of pressurized air that is controllably directed onto the printed substrates passing under the dryer to aid in drying the printed surface.

4. The assembly of claim 1 wherein the control unit comprises programmable controllers which receive the input from the heat sensors and regulate output of the heating zones to achieve desired set point temperatures in the heated areas.

5. The assembly of claim 4 wherein the temperature of each heated area is regulated to about the same desired set point temperature.

6. The assembly of claim 1 wherein the signal generated by one of the heat sensors for a heated area is used to regulate the temperature of one or more of the other heated areas.

7. The assembly of claim 1 wherein the signal generated by one or more of the heat sensors for some heated areas are used to bias the signal generated by sensors for one or more other heated areas in order to alter the temperature regulation of said one or more other heated areas.

8. The assembly of claim 4 wherein the programmable controllers are programmed to receive input from a sensor which is indicative of the temperature of a heated area on said substrate and receive input from at least one other sensor and adjust output of a heating zone located over another portion of the substrate at least partially based upon the input of said at least one other sensor.

9. The assembly of claim 4 wherein the plurality of heating zones comprise at least four heating zones, each having an output which is separately adjustable.

10. The assembly of claim 4 wherein the plurality of heating zones comprise at least six heating zones, each having an output which is separately adjustable.

11. The assembly of any one of the preceding claims further comprising one or more air supply chambers with a supply of pressurized air to direct high velocity air against the printed

or coated surface of sheets being transferred along the substrate travel path to provide additional drying.

12. The assembly of claim 11 wherein said one or more air chambers comprise at least one heated air chamber box which directs heated high velocity air upon the printed or coated surface of substrates moving along the substrate travel path.

13. The assembly of claim 4 further including at least one extractor which extracts moisture laden air from the press delivery system.

14. The assembly of claim 4 wherein the control unit includes an input and monitoring device which receives operating parameters from the operator and sends data to said computer operated controllers which includes temperature set points for the heated areas.

15. The assembly of claim 14 wherein the input and monitoring device is a touchscreen operably connected to the programmable controllers comprising loop controllers having a feedback control loop responsive to the signal generated by the heat sensors for controlling output from the plurality of heating zones.

16. The assembly of claim 15 wherein the touchscreen is adapted to receive data representative of the width of the substrate and in cooperation with the programmable controllers deactivates heating zones in side areas beyond the substrate width.

17. The assembly of claim 15 wherein the control unit includes a programmable logic controller operably connected to the touchscreen which controls operation of one or more auxiliary motors.

18. A power saving automatic zoned dryer assembly for a printing press having a substrate travel path, comprising:

a dryer head adapted for mounting in the printing press facing the substrate travel path, the dryer head having a multiplicity of IR lamps connected individually or in groups to form a plurality of heating zones, each zone running longitudinally and extending laterally across part of the travel path;

a power supply operably connected to the IR lamps in a manner that allows output of said plurality of heating zones to be controlled separately;

a control unit connected to the power supply, the control unit being operable to individually adjust output of the heating zones;

a plurality of sensors spaced laterally across the substrate path to generate signals indicative of temperatures corresponding to heated areas of substrates passing under the heating zones when the press is printing; and

whereby the temperature of substrates in the travel path corresponding to areas heated by the heating zones can be adjusted and controlled by the control unit which adjusts output of the heating zones in response to the signals generated by said sensors while the press is printing.

19. The assembly of claim 18 wherein said plurality of heating zones comprise at least two heating zones, each having an output which is separately adjustable.

20. The assembly of claim 19 wherein at least some of the plurality of sensors are mounted in a housing which has an air supply for passage of air under pressure to prevent dust or spray powder from interfering with operation of the sensors.

21. The assembly of claim 20 wherein the air supply of the housing is offset to introduce swirling air around the sensor.

22. The assembly of claim 18 wherein the control unit includes one or more programmable controllers which receive the sensor outputs and adjust the heating zones to achieve a preselected desired set point temperature in the heated areas.

23. The assembly of claim 22 wherein the control unit includes an input and monitoring device which receives operating parameters from the operator and sends data to said one or more controllers, including the temperature set points, and monitors temperature in said heated areas of said heating zones as indicated by the sensors.

24. The assembly of claim 23 wherein the input and monitoring device is a touchscreen operably connected to programmable controllers comprising loop controllers having a feedback control loop for each of the multiplicity of IR lamps which regulate the IR lamps.

25. A power saving method of regulating temperature of printed or coated substrates exposed to infra-red (IR) drying as they move along a substrate path in a printing press, comprising the following steps:

moving a succession of printed substrates along the substrate path;

providing an IR dryer comprising a plurality of separately controlled IR heating zones, each zone running longitudinally and extending laterally across part of the substrate path;

heating a plurality of longitudinally extending, laterally spaced heated areas on the printed substrates corresponding to the heating zones as the substrates pass under the IR heating zones of the IR dryer;

sensing the temperature of the heated areas; and

adjusting the output of the heating zones in response to the sensed temperature of the heated areas corresponding to said heating zones.

26. The method of claim 25 wherein the step of heating a plurality of longitudinally extending, laterally spaced heated areas on the printed substrates corresponding to the heating zones includes the step of simultaneously scrubbing the surface of the heated areas with high velocity air.

27. The method of claim 26 further including the step of extracting spent high velocity air after it has scrubbed the heated areas.

28. The method of claim 25 further including the step of providing a supply of pressurized air; and

scrubbing the printed or coated surface of the substrate sheets with high velocity air from said source.

29. The method of claim 28 wherein said source provides pressurized heated air and the surface is scrubbed with high velocity heated air from said source.

30. The method of any one of claims 25 - 29 further including the step of extracting air from the press delivery system.

31. The method of claim 25 wherein the step of providing an IR dryer includes setting desired set point temperatures for the heated areas and the step of adjusting the output of the heating zones comprises the step of making the sensed temperatures in each heated area approximate the desired set point temperatures by changing the output of one or more of the heating zones.

32. The method of claim 25 further including the step of establishing set point temperatures for the heated areas and wherein the step of adjusting the output of the heating zones is performed in a manner that regulates the temperature of the heated areas near the set point temperatures.

33. The method of claim 32 wherein said step of adjusting the output of the heating zones is performed in such a manner that the desired set point temperatures of the heated areas are regulated at about the same desired temperature.

34. The method of claim 25 wherein the step of providing a plurality of separately controlled IR heating zones includes establishing said heating zones across a width of substrate path in excess of the substrate width and the step of heating a plurality of heated areas on printed substrates passing under the IR dryer includes the step of operating only heating zones within the width of the substrates moving along the substrate path.

35. The method of claim 25 further including the step of passing air under pressure through the IR dryer to impinge on the printed substrates.

36. The method of claim 35 further including the step of providing a source of pressurized air across the substrate travel path; and

impinging high velocity air upon the printed or coated substrate either before or after the heating step is performed.

37. The method of claim 36 wherein the source of pressurized air comprises heated air and the step of impinging the surface of the printed sheet with high velocity air comprises the step of impinging said surface with heated high velocity air.

38. The method of one of claims 36 or 37 wherein the method further includes an extraction step whereby air is extracted from the press delivery system.

39. The method of claim 35 further including the step of directing the air passing through the IR dryer to flow through the heating zones thereby heating the air before it impinges on the substrates.

40. The method of claim 25 wherein the step of sensing the temperature of the heated areas is performed by a plurality of sensors and further includes the step of providing air under pressure to one or more of said sensors to prevent dust or spray powder from interfering with sensor efficiency.

41. The method of claim 40 wherein the step of providing pressurized air to one or more of said sensors comprises the step of swirling the air to reduce deposits of dust or spray powder on sensor sensing surfaces.

42. A power saving method of regulating temperature of differentially heatable areas of printed substrates exposed to infra-red (IR) drying as they move along a substrate path in a printing press; comprising:

moving a succession of printed substrates along the substrate path;

providing an IR dryer head assembly spaced from the substrates, the dryer head assembly having a plurality of IR heating zones with adjustable outputs, each zone running longitudinally and extending across part of the width of the substrates;

operating said plurality of IR heating zones while substrates are moving along the substrate path;

generating signals representative of temperatures of portions of the substrates corresponding to heated areas of the substrates passing under the IR heating zones;

adjusting and controlling output of the IR heating zones in response to said signals in order to selectively maintain temperature of the substrates passing under the IR heating zones within a desired range of temperature despite absorption of different amounts of IR energy in areas of the substrates passing under different heating zones;

whereby printed substrates having a more even temperature profile are delivered.

43. The method of claim 42 wherein the step of adjusting and controlling the output of the heated zones in response to signals representative of temperatures of substrates corresponding to heated areas of substrates passing under heating zones includes the step of periodically incrementing or decrementing the power supplied to the heating zones by an amount based upon the signals representative of the temperature of the printed substrates corresponding to heated areas of the substrates passing under the heating zones.

44. The method of claim 43 wherein the step of generating signals representative of temperatures of the substrates corresponding to heated areas of the substrates passing under the IR heating zones comprises the step of operating sensors positioned to sense the heated areas.

45. A method of regulating temperature of a controlled zone dryer for a printing press of the type having a plurality of IR lamps spaced to establish heating zones, temperature sensors that generate signals indicative of the temperature generated by at least some of the heating zones and a sufficient number of controllers to adjust the output of the heating zones, wherein the improvement comprises:

arranging the IR lamps so that the heating zones are longitudinal with respect to the printing press; and

regulating the output of individual heating zones in response to said signals.

46. The method of claim 45 further including the steps of transferring printed sheets through the press; and

scrubbing the surface of the sheets being transferred through the press with high velocity air.

47. The method of claim 46 wherein said step is performed with heated high velocity air.

48. The method of one of claims 46 or 47 further including the step of extracting scrubbed air from the press delivery system.

49. The method of claim 45 wherein the step of regulating the output of individual heating zones in response to the signals regulates the outputs to a temperature set point.

50. A method of regulating temperature of a controlled zone dryer of the type having a plurality of IR lamps spaced to establish heating zones, temperature sensors that generate signals indicative of the temperature generated by at least some of the heating zones and a sufficient number of controllers to adjust the output of the heating zones, wherein the improvement comprises:

moving articles along a path

arranging the IR lamps so that the heating zones are longitudinal with respect to the path; and

regulating the output of individual heating zones in response to the signals.

51. The method of claim 50 wherein the step of regulating the output of individual heating zones in response to the signals regulates the outputs to a temperature set point.